

# PATENT SPECIFICATION



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409,528

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## COMPLETE SPECIFICATION.

### Improvements in Liquid Conducting Conduits.

(A communication from abroad from the AEROL ENGINE CORPORATION, a corporation organised and existing under the laws of the State of New York, United States of America, of 26, Washington Square, Newport, Rhode Island, United States of America.)

I, ARTHUR FREDERICK BURGESS, a British Subject, of the firm of Lloyd Wise & Co., of 10, New Court, Lincoln's Inn, in the County of London, Chartered Patent Agents, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has for its principal object the production of a conduit or tubing for conducting liquids therethrough and so constructed as to prevent the formation of airlocks therein when the liquid is flowing or is forced therethrough.

In certain types of machines or engines it is absolutely necessary that oil or fuel be fed from one location to another without collecting in bends to form airlocks in order that the machinery or engine shall function effectively and satisfactorily. This is especially true in injection lines of solid injection Diesel engines to which the invention is particularly applicable.

The liquid conducting conduit according to the invention comprises an outer tubular member and an inner filling member fitted snugly therein so as to occupy the major portion of the interior thereof, said members being formed to include between them one or more restricted spiral passageways of uniform cross-sectional area, extending throughout the entire length of said conduit.

In the accompanying drawing illustrating several practical embodiments of the invention:

Fig. 1 is a cross section taken through the conduit shown in Fig. 2.

Fig. 2 is a horizontal section taken through the conduit.

Figs. 3 and 4 are views similar to Figs. 1 and 2, respectively, but showing a modification.

Figs. 5 and 6 are views similar to Figs.

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1 and 2 and showing in section and elevation, respectively, a further modification.

Referring in detail to the drawings:

A section of a fuel injection pipe is indicated at 1. This pipe is of uniform construction from the intake end, connected with the fuel pump or other means (not shown) for supplying fuel to the point of discharge into the combustion chamber of the self-igniting internal combustion engine. In order to break up any eddy streams and give the fuel a high velocity, sufficient to break up any air bubbles into fine particles and to prevent such air from collecting in the corners or elsewhere in the pipe, the interior of the pipe 1 is provided with an inner member 2 which occupies the major portion of the interior of the pipe 1. The member 2 constructed as shown in Figs. 1 and 2 is formed from a solid hexagonal bar twisted to form spiral passageways having a relatively shallow pitch. The inner member 2 so formed is fitted snugly within the interior of the pipe 1 so that the points of the inner bar engage the interior surface of the pipe for the entire length of the pipe. The result is a plurality of small smooth-walled tortuous fuel passages which give to the fluid passing through the same a high velocity. Any air bubbles therein are broken up into fine particles and readily absorbed and carried away in the fuel stream.

In the modification illustrated in Figs. 3 and 4 the outer tube or pipe is indicated at 4 and the inner solid member is indicated at 5. The configuration of the latter member conforms to that of the outer member 4 within which it is snugly received but the inner member is formed with a single spiral passageway 6.

In the foregoing examples the filling member is made of out-of-round bar material. In the modification of Figs. 5 and 6, on the contrary, the outer member 7 is formed with a plurality of angled sides, it being rectangular in the specific embodiment shown. The inner solid member 8 is round and fits snugly within the outer member. The outer rectangular member is twisted, as will be clearly seen in Fig. 6, to form a plurality of spiral

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passageways 9, indicated in Fig. 5.

The use of the above described devices will be readily understood. As will be seen, the tubing through which the fuel supplied from the fuel pump or other means of supply passes to the intake in the engine presents to the flowing fuel one or more small uniform spiral passages, thereby giving the fuel a high velocity. The result is that any air bubbles in the fuel passageway or passageways are broken up and carried away with the fuel stream. This result is accomplished without materially decreasing the flow of fuel since passages formed in accordance with the invention are smooth and substantially uniform in cross section from one end of the tube to the other.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A liquid conducting conduit, such as a conduit for conducting fuel from a fuel pump or other means for supplying fuel to the combustion chamber of an internal combustion engine, said conduit comprising an outer tubular member and an inner filling member fitted snugly therein so as to occupy the major portion of the interior thereof said members being

formed to include between them one or more restricted spiral passageways of uniform cross sectional area, extending throughout the entire length of said conduit.

2. A conduit according to claim 1, wherein either the inner or the outer member is formed of out-of-round material twisted on a gradual pitch.

3. A conduit according to claim 1 or claim 2 wherein the inner filling member consists of a twisted bar which presents alternate spiral projecting edges and intervening smooth portions to the interior of the outer tubular member to form one or more restricted enclosed spiral passageways.

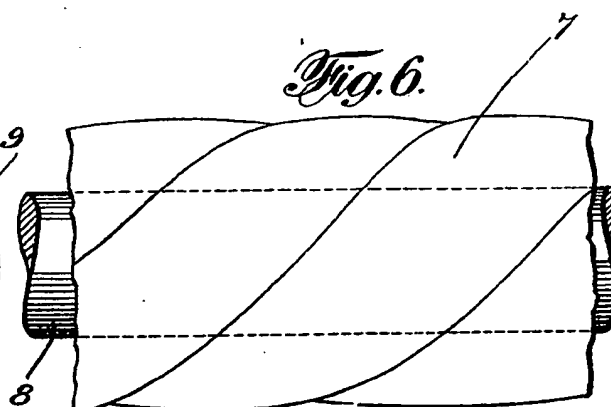
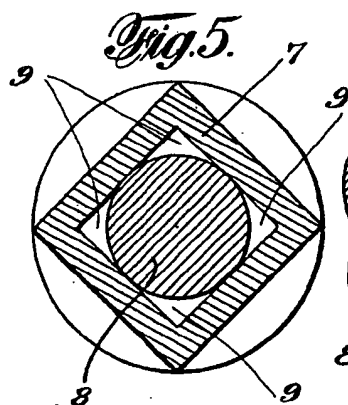
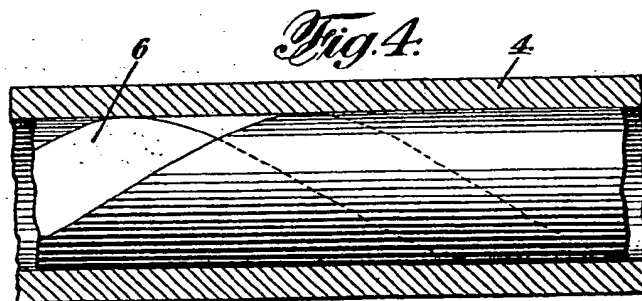
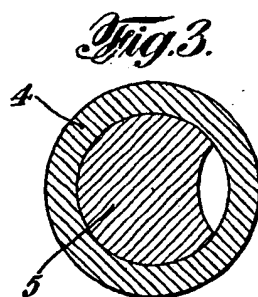
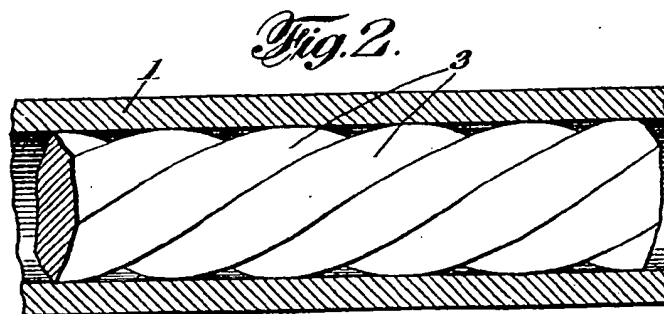
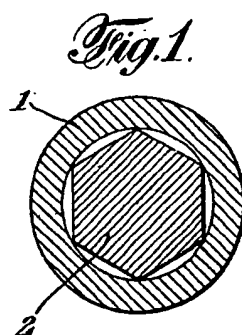
4. A conduit according to claim 2 having an inner filling member of substantially round cross section and a twisted outer member formed of out-of-round material.

5. A conduit for conducting liquid, constructed and operating substantially as described with reference to the accompanying drawing.

Dated this 28th day of June, 1933.

For the Applicant,

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[This Drawing is a reproduction of the Original on a reduced scale.]